

## 6. SUSTAINABILITY

PREPARED BY GIFFORD SUSTAINABILITY ENGINEERS

### 16778 R01 Kalwall Sustainability Performance

Gifford is a leading independent engineering and environmental consultancy whose experts combine science and engineering to create buildings and deliver infrastructure projects that work commercially, socially and environmentally. They provide advice on energy, sustainability, heritage and archaeology, development and regeneration, the environment and transport planning. Gifford was named by The Sunday Times as one of Britain's 100 Best Companies to Work For and placed in the newspaper's Best Green Companies.

Gifford's Sustainability Team was appointed to undertake a performance appraisal of Kalwall. A range of performance areas have been considered within Gifford's independent Sustainability Appraisal Process (GSAP), which covers wider reaching aspects than the BREEAM Assessment. It is intended this appraisal can be used by developers to justify the credentials of this building material.

A sustainable solution is one that provides a balance of environmental, social and economic factors. The product's performance has been recorded under each of the following headings to ensure a holistic outlook:

- **Climate and Energy**, including impact on flooding, carbon emissions as well as future temperature increase.
- **Community**, including community and social impacts.
- **Waste and Resources**, including the use of recycled materials and the implementation of a waste and resources strategy.
- **Economic Impact**, including creating new markets, skill development and wealth creation.
- **Pollution**, including manufacturing and operational impact on all streams of pollution.

Kalwall composite panels are translucent, self-supporting products formed by permanently bonding fibre glass sheets to a grid core, constructed of interlocked thermally-broken or non-thermally broken aluminium I-beams.

#### Climate Change and Energy

- Kalwall panels help prevent overheating in buildings, allowing daylight into spaces with minimal solar gain. This provides buildings resistance to future temperature increase as a result of global warming.
- Panels help reduce a building's operational energy consumption and associated carbon emissions in a number of ways:
  - o Providing well daylight spaces reduces the need for artificial lighting.
  - o Decreased artificial lighting reduces internal heat gains, mitigating the need for artificial cooling.
  - o With u-values as low as 0.28W/m<sup>2</sup>K, panels reduce heat loss and subsequently heating demand.
  - o Panel can form part of natural ventilation strategy with opening lights in a similar way to glazing.
- Lightweight, modular panels are easily maneuverable, providing flexibility should the layout of the building need adapting in future.
- Panels require no mechanical lifting equipment, as they are manually handled, which will reduce energy consumption during construction. Standard modular panels also make for quicker construction.

## Community

- Panels help create a well daylit space people will enjoy – providing close to full spectrum daylight. Research has proven that good daylight helps improve the health and wellbeing of building occupants.
- The product has excellent impact resistance properties providing a secure building. Under hard body impact load the panel can withstand 10 Joules, with an ultimate loading of 2.2kN/m<sup>2</sup>.
- A punctured panel would be the worst case eventuality under high impact loading, unlike shattered glass which creates health and safety issues. Punctured panels can stay in place and can be repaired if necessary.
- Exterior faces include a permanent glass erosion barrier and self-cleaning surface to provide a robust product, which has a protective layer resistant to graffiti.
- Kalwall is a labour intensive business, employing significant manual labour. Employees are required to partake in regular training and health and safety programmes.
- The company take part in the United States programme of finding work for refugees as Manchester New Hampshire is a chosen refugee centre in the USA. They actively employee refugees and take part in settlement programmes, providing courses in improving language skills.

## Waste and Resources

- Kalwall have a waste management strategy for the manufacture of panels, compliant with the strict local, state and national environmental waste codes regarding disposal of all waste materials, effluents, water discharge.
- Each panel contains 22% recycled content. All incorporated aluminium is from recycled sources, which reduces the use of resources in the production of panels.
- The modular nature of the product helps reduce waste arisings during building construction.
- The panel system has a typical lifespan of 25-50 years, provided it is maintained properly. It is a durable product with a smooth weather resistant surface and erosion prevention barrier. It has a polymer/fibreglass base with resistance to UV and fire degradation.
- The product requires minimal maintenance during its life. Normal rainfall will keep Kalwall free of dirt and dust, and a periodic soapy water wash is all that is needed.
- Panels and systems are 100% recyclable at the end of life. All aluminium content is recycled and FRP face sheets are ground into a powder which is used as filler in other FRP products, such as cars, boats and building panels. As this reduces the volume of waste sent to landfill.
- In addition, the materials used for packaging - paper, cardboard and wood – are all recycled and can be recycled again at their end of life.
- Kalwall reduces the impact of its manufacturing processes by reusing water in the cooling process in water chillers, recycling acetone cleaners and incorporating heat recovery units.
- The use of Kalwall can reduce or eliminate the need for other solar control devices such as brise-soleil, blinds, curtains and light shelves.
- Although the product does not currently have a UK Green Guide rating, it is listed in GreenSpec® Directory required as part of the LEED Assessment. The product has been specified in a significant number of BREEAM and LEED certified buildings.
- Panels provide a clean, smooth roofing material to collect rainwater for recycling in buildings, reducing operational water consumption.

## Economic Impacts

- Being a major employer in Manchester New Hampshire, Kalwall is conscious of their social responsibilities. The company supports local clubs and crime prevention schemes.
- The company's main initiative to support the local community is providing work to displaced persons who would otherwise have difficulty finding employment.
- The product's lifecycle cost is minimal. The guaranteed design life is 25 years, although with proper maintenance it can be almost unlimited. Assuming a building has a 60 year life span, it is expected the system will require only one replacement.

## **Pollution**

- Panels diffuse light, reducing light pollution from the building, eliminating direct beam night time illumination when compared against a glazed solution. The building façade appears as 'glowing'.
- The Kalwall system has European Technical Approval (CE) EU certification. Panels comply with Guidance Paper H relating to the release of dangerous substances.
- VOC emissions have been significantly reduced by changing the chromate primer to a water-based alternative in the painting operation.
- Kalwall encourages employees to use public transport to travel to work. The factory is on a main bus route and employee parking is restricted to encourage sustainable modes of transport.
- The product is shipped from the US directly to the UK on a full container load basis. Shipping emits less CO<sub>2</sub> than any other type of freight transport.
- Structura UK Limited are responsible for transporting materials to sites within the UK. Where possible, loads are combined when orders do not completely fill a container.